Docket No.: GR 98 P 1824
Application No.: 09/725,343

CERTIFICATION

I, the below named translator, hereby declare that: my name and post office address are as stated below; that I am knowledgeable in the English and German languages, and that I believe that the attached text is a true and complete translation of the fax pages numbered 5/15 and 7/15 through 11/15 of the invention disclosure bearing No. 96 E 2477.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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1. What technical problem is to be solved with your invention?
2. How is this problem presently being solved?
3. How does your invention solve the indicated technical problem?

1. Simplified interconnection of different single-cell base stations to an interconnection (radio network) in which seamless handover between adjacent base stations becomes possible. Each base station is thereby connected to the switch by means of common digital connection technology ($U_{PO/E}$, S_0, S_{2m} or DIUS2) and the base station addressing is carried out in the switch. This leads to a decentralization of the feature "wireless telephoning in local networks." The handset addressing takes place, as is common for wired telephones, via the subscriber number registered in the switch. Switch-neutral implementation of digital, cordless subscribers by activation of base stations such as other wired telephones.

2. Central control device for all components of the radio network consisting of individual base stations. The individual ports for subscriber numbers of the handset in the switch, such as telephone numbers of wired telephones are displayed.

3. See file note:
Multi-cell systems from the interconnection of any number of individual base stations – self-sufficient system for the synchronization of radio cells and service areas for seamless handover of existing calls when changing the radio cell or a service area, respectively.

4. For further explanation, enclosed are:

4 sheets of illustration of one or a plurality of exemplary embodiments of the invention;
___ sheet of additional description (e.g., laboratory reports, test protocols);
___ sheet of literature which describe the state of the art on which the invention is based
___ other documentation (e.g., diskettes, in particular with drawings of the exemplary embodiments):

Multi-cell systems from the interconnection of any number of individual base stations – self-sufficient system for the synchronization of radio cells and service areas for anywhere seamless handover of existing calls when changing the radio cell or a service area, respectively.

General Matters:

The real-time conditions for interference-free transition of the connection between base station and handset, preferably in DECT systems, when changing between base stations, requires a high accuracy of phase and clock synchronicity. The admissible tolerance of 2 micro seconds enables – provided that the clock supply of the base stations takes place centrally through the system – the wire length difference of 500 m during the transition from one to another base station.
The illumination of areas above base stations partially determines the wire guide via feed lines to the base stations, which require a wire length difference of more than the possible 500 m wire length difference. Furthermore, modern wiring concepts such as LAN and ATM hinder the integrated clock supply in the signaling channel, such as this is possible in ISDN-realizations with primary rate (PR) and basic rate access (BA). The way out is a self-sufficient network-wide synchronization of the individual components which are controlled by a central synchronizer with high clock accuracy, in the master/slave mode.

Requirements from phase and clock synchronicity during call transition between adjacent base stations.

The transmission of electric signals in copper lines takes place via light speed, which holds true preferably, however, for low-frequency signals and at higher signal frequencies, electric conductors have a characteristic impedance which reduces the transmission speed down to 2/3 of the light-speed. The requirements on the synchronicity of the base stations is 2 micro seconds. At light speed, an electric signals runs through 600 m of wire within 2 micro seconds. It is derived from this knowledge that within an existing connection between a handset and the base

station, the handset must be synchronized to the base station and during the change to the next base station, the synchronicity cannot be interrupted. A distance difference between two base stations which supply the same handset may thus be no more than 600 m in air. This condition is adhered to in DECT, because cell radii of 300 m are supplied due to the transmission power of base stations. This means that adjacent base stations which are supplied by a common synchronous source, correspond to the synchronization requirements during the call transition.
A DECT radio network is designed to the handset operation for signaling speed to average speed of the user. The information exchange between handset and the base stations takes place with 100 Hz repetition rate (10 ms clock). At a motor vehicle speed of 100 km/h, the motor vehicle requires approximately 10 seconds in order to pass a distance of 300 m. During this time period, 100 call and signalizing information has been exchanged between handset and base station, which corresponds to a data amount of 4 Kbytes user information in DECT standard.
In summary it can thus be seen that a synchronization concept over radio paths is sufficient in order to operate adjacent DECT base stations without synchronization loss.

Concept of the self-sufficient synchronization of DECT base stations

The required synchronization of the base stations is achieved in that each base station is equipped with a radio receiver which is integrated into a PLL circuit for the purpose of ISDN clock supply. Clocked by this circuit, the identification (EIC) which is stamped on the respective DECT system , is transmitted via all of the corresponding base stations. This characterization is stamped into the corresponding base stations according to the principle of the EIC as 32 bit information during the installation and/or the development of the DECT systems.

Cordless networks: Solution concept without central control

Presently, a server concept for cordless telephones is developed under the name CMI which is based on an inter-working-unit which, as compared to the upstream switching system, emulates the interface of a digital subscriber.
Technically/economically, these subscriber ports are imaged on components, which

have interfaces to speech-highway and signaling highway of the switching system such that 64 user information channels can be switched at the same time. The resulting traffic load for the switching system is thus decoupled from the use package "cordless" and is to compared with the traffic load of 64 wired digital subscribers.

In Hicom cordless E for Hicom 300, in the first phase, the implementation of four server components SLMC is provided which conceptually control the information exchange among each other via signalization connections and which together form a common DECT system. The clock supply of the base stations connected to the server component SLMC is derived from the switching system and the present wire reach for base stations is 100 m distance to SLMC.

Differing from a centralized concept of the multi-cell solution for cordless DECT telephony, the self-sufficient adjacency of any number of DECT base stations is proposed such that via multiplexer (MUX2) two base stations are connected to the switching system via S_{2m} (DIUS2). The maximum switching from each base station corresponds to twelve digital telephones, i.e. 12 user channels in PCM coding according to G.711 (64 kbit/s with 3.1 kHz bandwidth). Three additional use channels per base station are present for the required data communication for the administration of the actually participating cordless end device and the treatment of overloads on the respective base station. Each base station is a fast hopping base station and with self-sufficient synchronization (see above concept).

A further variant is the activation of Hicom cordless S or Gigaset 1054isdn with above-described self-sufficient synchronization device per base station. Due to the fact that each base station provides the transition to ISDN, this concept corresponds to the end device switching of wired ISDN telephones to UP0E or S0-bus (e.g., optiset or profiset 50 isdn). The variant "cordless profiset" or "cordless optiset" can thus be defined as subscriber end device, which represent the wired network termination for the handset operation.

The registration of the handset is via the subscriber number as in other wired telephones in the private branch exchange; the approved handsets for each system are to be registered in a – supplementary – memory of each base station. Condition for the proposed concept is the load capacity of the common EIC identification for all base stations of a multi-cell system, preferably via the system operation technology (32 bit identification including base station number) and the addressability of the

register table of approved handsets in each base station (update via operation technology).

Description of the Process:

As can be seen from the enclosed structured chart, the decentralized activation of the ISDN part of the base station is based on:
- static processing of a subscriber memory for all registered handsets in each base station
- end device intelligence which supports the interworking to switching, operation and safety technology of the upstream ISDN switching technology as in comparable wired solutions.
- routines which dynamically illustrate the subscriber mobility of the handset number, comparable to the tracing of the subscriber power feature via an authentication card in cord-bound telephones on the base station (terminal mobility).

The structured chart assumes an assignment of the handsets to certain base stations which are controlled in a decentralized manner and this assignment is characterized with "home location." All positioning in other cells, however, are characterized as "visitor location." In order to reduce the dynamic in the system for a roaming a "registration call" is initiated during a switch from the "off state" of the handset to the "IDLE state" of the handset, which enables a well-aimed roaming. By means of the time-controlled "registration cell" from the base stations, the table of the handset present in the respective cell region is updated in a base station-internal manner and the automated call diversion is updated in the device memory of the switch, when location changes have taken place for the handset.

Summary

The multi-cell telephony/communication – preferably on the basis of DECT – has extreme synchronization demands when the base station is changed during the course of a call. Instead of central clock supply through the upstream system and resulting running time in the wire feeds, an external synchronization is proposed such that the base stations are triggered via ultrahigh radio impulses which are binding for all of the base stations together. The trigger impulse is constantly offered with refresh in order to maintain the self-sufficient cock supply in a common mode with the local clock generator for all base stations (drift prevention). Locally, the administration of the approved handsets and the belonging to the entire system (service area) is stored in each base station (remove administration via operation technology of the switch).

With this concept, the present high effort for the realization of the LM "cordless" on the basis of central server solution in private extension areas is reduced to the known activation technology of end devices in ISDN private extension devices.